

THE OFFICE ACTION

In the Office Action issued on September 4, 2003, the Examiner objected to the specification as failing to provide proper antecedent basis. Specifically, the Examiner requested correction of terms in claims 1, 13-15, and 17-22. The Examiner rejected claims 1-4, 6, 7, 9 and 10 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,923,394 to Miyazaki et al. (Miyazaki). The Examiner further rejected claims 1-7, 9 and 10 under 35 U.S.C. §102(b) as being anticipated by UK Patent No. 2,329,481 to Molsen et al. (Molsen). The Examiner also rejected claims 1-4 and 8 under 35 U.S.C. §10(b) as being anticipated by U.S. Patent No. 5,831,700 to Li et al. (Li). The Examiner indicated that claims 11, 12, 16 and 23 were allowed and that claims 13-15 and 17-22 contained allowable subject matter.

REMARKS

Applicants have carefully considered the Office Action issued on September 4, 2003. Applicants respectfully request reconsideration of the application in light of the following comments. Claims 1-23 remain pending in the application.

A. The Examiner's Objections to the Claims Have been Corrected

The Examiner rejected claims 1-6 and 8-14 under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. Specifically, it is the Examiner's position that the specification fails to provide antecedent basis for the claimed subject matter. In particular, the Examiner stated there is no antecedent basis for the recitation "the director" in claim 1, that the recitation "micro-patterns" in claims 13-15, 17-20 and 22 should read "micro-structures", and that the recitation "micro-walls" in claim 21 should read "micro-structures". Appropriate correction has been made to the above claims. Applicants therefore respectfully request withdrawal of this rejection.

B. The Pending Claims Are Not Anticipated by Miyazaki, Molsen or Li

The Examiner rejected claims 1-10 under 35 U.S.C. §102(b) as being anticipated by one or more of Miyazaki, Molsen and Li. Applicants respectfully traverse for at least the following reasons.

First, none of the cited references disclose a liquid crystal device having polymer micro-structures formed between the substrates wherein the micro-structures have a shape and spatial location determined by the director field. In this respect, Miyazaki, Molsen and Li all disclose liquid crystal devices including a pair of opposed substrates having a gap therebetween, an alignment layer disposed adjacent the two substrates, electrodes adjacent the substrates and a liquid crystal and polymer network formed in the gap between the substrates. Nevertheless, none of the references disclose the presence of polymer micro-structures, nor wherein such polymer micro-structures have a shape and location determined by the liquid crystal director field.

The present invention is directed to the formation of micro-structures such as, e.g., microwalls. These micro-structures are formed by causing the liquid crystal material to assumed a predetermined orientation with a non-uniform spatially distorted director and thereafter polymerizing the prepolymer material to form a polymer with defined micro-structures. The phase separation that occurs as the prepolymer polymerizes in the presence of a spatially modulated liquid crystal director field and the distortions produced therefrom results in the formation of the polymer micro-structures. That is, it is the inhomogeneity of the director field that determines the position and shape of the micro-structures. It should be noted that the polymerization of the prepolymer is not effected until the desired director structure is achieved, such as by the application of a voltage across the electrodes.

None of the cited references disclose or suggest such micro-structures however. Molsen, for instance, discloses a liquid crystal and polymer network in the liquid crystal cell. The polymer therein may have a network structure (pg. 5) due to crosslinking, but the polymer does not possess micro-structures having a shape and location determined by the liquid crystal director field. In fact, and with reference to figures 4, 7, and 8 therein, the polymer network appears to have a random but uniform orientation. Similarly, Miyazaki and Li both fail to disclose or suggest the

presence of polymer micro-structures having a shape and location determined by the director field. The shape and positions of the polymer structure is not effected by the director field, since the director field in each reference is uniform and homogenous throughout the space between the substrates.

Further, and with respect to claim 2, none of the references disclose polymer micro-structures affixed to at least one of the substrates. That is, none of the references disclose or even suggest that the polymers are affixed to the substrates. With reference to Molsen, the figures presented therein (i.e. figures 4, 7, and 8) all appear to show a polymer network free floating in the liquid crystal cell without any attachment to either of the two substrate surfaces.

Because none of the references disclose a liquid crystal device having polymer micro-structures, nor wherein such polymer micro-structures have a shape and location determined by the liquid crystal director field, Applicants respectfully request withdrawal of the anticipation rejections based on Miyazaki, Molsen, and Li.

CONCLUSION

In view of the foregoing comments, Applicants submit that claims 1-23 are in condition for allowance. Applicants respectfully request early notification of such allowance. Should any issues remain unresolved, the Examiner is encouraged to contact the undersigned to attempt to resolve any such issues.

If any fee is due in conjunction with the filing of this response, Applicants authorize deduction of that fee from Deposit Account 06-0308.

Respectfully submitted,

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